

RECEIVED
CENTRAL FAX CENTER
SEP 18 2006

REMARKS

Claims 1-13 and 19 are pending in the present Application. Claim 9 is canceled and claims 20-26 are added with this Amendment.

Support for the amendment to claim 3 is found in the Specification at page 5, lines 19-21.

New claim 20 is supported by original claims 1 and 9, and by the Specification at page 9, lines 26-29 and at page 11, lines 28-30. Support for newly added claims 21-22 is found in the Specification at page 11, last line to page 12, line 13. New claim 23 is supported by the Specification at page 9, lines 26-29. New claims 24, 25 and 26 are supported by original claims 2, 5 and 8, respectively.

Claims 1-13 and 19 have been rejected under 35 USC § 103(a) as being unpatentable over Bresling et al. (US 6,562,732) in view of Odian (pg. 18 of *Principles of Polymerization*, 1981, 2nd edition) and Allen (US 6,420,441). Applicants traverse this rejection for at least the following reasons.

According to the Official Action at page 3, Bresling teaches a thermally degradable polymer and Odian teaches that polymers may be linear, branched or cross-linked. Also at page 3, the Official Action reads in pertinent part, "[h]ence, it would have been obvious to one with ordinary skill in the art to use any known thermal degradable polymer including instantly claimed cross-linked polymer in the process of Bresling because it is one of the most popular polymers used in the industry and because it is taught by Odian." Applicants strongly disagree with this assertion.

The Bresling patent discusses suitable polymers as being those which can be volatilized or degraded to smaller molecules. See col. 4, lines 1-3. Bresling further discloses that when a polymer is used, air gaps can be formed through a combined curing and baking step at 400° C, which decomposes the air gap polymer. The only examples of polymers disclosed in Bresling are linear polymers: PMMA (polymethyl methacrylate), polystyrene and polyvinyl alcohol. See col. 4, lines 3-4. No other types of polymers are disclosed in Bresling. This is not surprising to those skilled in the art as linear polymers are well-known to be less thermally stable than other types of

polymers, such as cross-linked polymers. There is no suggestion in Bresling to use a more thermally stable type of polymer. In fact, such a choice would not be obvious to those skilled in the art as the expected higher temperatures required could damage other layers within the electronic device.

While Odian teaches linear, branched and cross-linked polymers, Odian does not teach that such polymers are necessarily interchangeable. In fact, Odian clearly sets forth the differences between polymer types, particularly between linear polymers (as exemplified in Bresling) and cross-linked polymers. See Declaration of Dr. Clikeman at ¶¶8 and 9. In particular, Odian clearly teaches that cross-linked polymers have excellent stability toward elevated temperatures and are dimensionally stable under a wide variety of conditions due to their rigid network structure. Declaration of Dr. Clikeman at ¶9. Just because cross-linked polymers might be “popular” and are disclosed in a polymer textbook (Odian) is *no* motivation to use them in the method of Bresling which requires polymers having *low* thermal stability, particularly when that textbook (Odian) teaches cross-linked polymers to be *more* thermally stable.

The Allen patent has been cited to show cross-linkers.

A reference has to be considered for all that it teaches. The Bresling patent clearly sets forth the requirement that the air gap forming polymer be thermally degraded. Further, the Bresling patent only exemplifies linear polymers. The Odian reference makes clear that different types of polymers are not necessarily interchangeable. Odian also makes clear that cross-linked polymers have excellent stability toward elevated temperatures and are dimensionally stable under a variety of conditions due to their rigid network. Thus, one skilled in the art reading Odian would not be motivated to use cross-linked polymers in the method of Bresling which requires the polymers to be easily removed thermally. Even if one were to look to cross-linked polymers after reading Odian, there is nothing in the combination of these references that would lead one skilled in the art to reasonably expect that an entire layer of a *cross-linked* polymeric sacrificial material could be thermally removed to form an air gap.

Applicants submit that the Official Action has not made out a *prima facie* case of obviousness and respectfully request that this rejection be withdrawn.

Claims 1-13 and 19 have been rejected under 35 USC § 103(a) as being unpatentable over Babich et al. (US 6,815,329) in view of Odian and Allen. Applicants traverse this rejection for at least the following reasons.

In the Babich patent, the only polymers used as the sacrificial material are linear polymers. See column 8, line 57 to column 9, line 8. The particular polymers disclosed in this patent are norbornene polymers, polymethyl methacrylate, polystyrene, polycaprolactone, and polyacrylamide, all of which are *linear* polymers. Other suitable materials for use as sacrificial materials are described in this patent as "low thermal stability versions" of various materials. See column 8, last line, and column 9, line 3. Throughout this patent, the sacrificial material is often referred to as "low thermal stability" material. One skilled in the art reading Babich et al. would be lead to a sacrificial material that had low thermal stability, i.e. it was thermally removable or degradable.

The Allen patent has been cited to show cross-linkers.

Odian is discussed above. Odian clearly teaches the excellent stability of cross-linked polymers to elevated temperatures as well as their stability toward physical stress and dimensional changes. Certainly, one skilled in the art reading Odian would *not* be motivated to use a polymer having such properties of stability, particularly at elevated temperatures, as a sacrificial material where such sacrificial material needs to be removed thermally. One would simply use a less stable material to begin with, such as the linear polymers disclosed in Babich. Even if one skilled in the art tried a cross-linked polymer after reading Odian, given the requirement in Babich that the sacrificial material be readily thermally removable, there is no reasonable expectation that the use of a *more* thermally and dimensionally stable material (i.e. a cross-linked polymer) would work in the method of Babich.

Applicants submit that the Official Action has not made out a prima facie case of obviousness and respectfully request that this rejection be withdrawn.

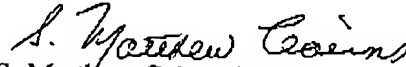
References are good for what they teach as well as for what one skilled in the art may reasonably infer from them. Both the Bresling and Babich patents require polymers that are thermally degradable. In fact, Babich is abundantly clear in its requirement for "low thermal stability versions" of materials. If one skilled in the art were to draw any inferences from either of these patents, it is that high thermal stability polymers do not comport with their teachings. When that same person skilled in the art reads Odian, that person will learn that cross-linked polymers have, inter alia, excellent thermal stability and are more dimensionally stable, than linear polymers. Thus, one skilled in the art reading Odian would be lead away from the use of cross-linked polymers in the method of either Bresling or Babich.

The Official Action at pages 3 and 6 finds a teaching, motivation or suggestion to use cross-linked polymers simply because they are well-known (commercially available). If cross-linked polymers are well-known, then the properties of these polymers are also well-known to those skilled in the art. As discussed above, Odian clearly teaches that cross-linked polymers have excellent stability at elevated temperatures. Accordingly, one skilled in the art would know and appreciate the increased stability of cross-linked polymers under conditions of elevated temperatures. Thus, one skilled in the art would avoid cross-linked polymers in the methods of Bresling and Babich, which require low thermal stability materials.

Applicants claim 20 requires disposing a cross-linking monomer composition on a substrate and curing (polymerizing) that monomer to form a cross-linked sacrificial material on the substrate. Such a step is neither taught nor suggested in either the Bresling or Babich patents.

Favorable reconsideration in the form of a notice of allowance is respectfully requested.

Respectfully submitted,



S. Matthew Cairns, Ph.D.

Attorney for Applicant

Registration No. 42,378

Telephone No: (508) 229-7545

Facsimile No.: (508) 787-4730

ROHM AND HAAS ELECTRONIC MATERIALS LLC

455 Forest Street

Marlborough, MA 01752

Date: September 18, 2006